

Amendment and Response

Applicant: Thian Moy Shirley NG

Serial No.: 10/588,340

Filed: August 3, 2006

Docket No.: I431.165.101/FIN572PCT/US

Title: SEMICONDUCTOR PACKAGE WITH HEAT SPREADER

REMARKS

The following remarks are made in response to the Non-Final Office Action mailed July 1, 2008. Claims 43-44 have been withdrawn from consideration. Claims 19-42 and 45 were rejected. With this Response, claims 19-26, 35-42, and 45 have been cancelled without prejudice, claims 27 and 32 have been amended, and claims 46-50 have been added. Claims 27-32, 34, and 46-50 remain pending in the application and are presented for reconsideration and allowance.

Claim Rejections under 35 U.S.C. § 102

Claims 19-26, 35-42, and 45 were rejected under 35 U.S.C. 102(b) as being anticipated by US Patent No. 6,114,761 to Mertol et al. ("Mertol").

Claims 19-26, 35-42, and 45 have been cancelled without prejudice.

Claim Rejections under 35 U.S.C. § 103

Claims 27-34 were rejected under 35 U.S.C. 103(a) as being unpatentable over Mertol in view of US Patent No. 6,541,310 to Lo et al. ("Lo").

Claim 33 has been cancelled without prejudice.

The Office Action admits that Mertol fails to teach or suggest sawing grooves on an upper surface of the modular heat spreader, but concludes that such a teaching is obvious in view of Lo. Applicant respectfully submits that neither Mertol nor Lo, either alone or in combination, teach or suggest the present invention as defined by independent claim 27.

With reference to Figures 10A and 10B, as directed by the Office Action, Lo describes a heat spreader frame 20 configured to be positioned within an encapsulant mold 51 over a plurality of semiconductor chips 31, 32, 33 mounted on a substrate 10, with a bottom side of heat spreader frame 20 forming a mold cavity about semiconductor chips 31, 32, 33. A grid-work of protruded blocks 20g extend from a top side of heat spreader frame 20 and together form a network of lower lying areas or channels between them. A number of holes 20h are located in

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the lower lying areas about each of the protrusions 20g and extend through heat spreader frame 20 to the mold cavity. When the mold cavity is filled with encapsulant, the encapsulant pushes through holes 20h and fills the lower lying regions such that the encapsulant, after hardening, acts as a bolting means which secures heat spreader frame 20 to an encapsulation body 60.

In view of the above, the lower lying regions between the grid of protruded blocks 20g in the top side of heat spreader frame 20 do not represent and do not teach or suggest the use of sawing guide grooves, as stated by the Office Action. The lower lying regions are not grooves cut or formed in a surface of heat spreader frame 20 to act as sawing guide grooves, but result from the extension of the grid-work of protruded blocks 20g therefrom, and are configured as reservoirs to be filled with encapsulant material. In fact, after introduction of the encapsulant, the lower lying regions are filled and form a smooth surface and, thus, do not teach or suggest any type of groove or channel whatsoever. In view of the above, Applicant submits that the present invention, as defined by independent claim 27, is not obvious over Mertol in view of Lo.

As such, Applicant submits that neither Mertol nor Lo, either alone or in combination, teach or suggest a matrix package including a heat spreading having a plurality of sawing guide grooves on an upper surface, as defined by independent claim 27. Accordingly, Applicant respectfully requests that the rejection of dependent claim 27 under 35 U.S.C. 103(a) over Mertol in view of Lo be withdrawn and that independent claim 27 be allowed.

Dependent claims 28-32 and 34 further define patentably distinct independent claim 27. As such, Applicant respectfully requests that the rejection of dependent claims 28-32 and 34 under 35 U.S.C. 103(a) over Mertol in view of Lo also be withdrawn and that dependent claims 28-32 and 34 be allowed as well.

Added Claims

With this Response, claims 46-50 have been added, of which claims 46 and 49 are independent claims respectively directed to a semiconductor assembly and a heat spreader module, each including limitations directed to saw guide grooves as described above with regard

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to independent claim 27. As such, Applicant believes independent claims 46 and 49 to be in form for allowance over the art of record.

Additionally, because dependent claims 47 and 48 further define patentably distinct independent claim 46, and dependent claim 50 further defines patentably distinct independent claim 49, Applicant submits that dependent claims 47, 48, and 50 are also in form for allowance over the art of record.

Allowance of added claims 46-50 is respectfully requested.

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CONCLUSION

In view of the above, Applicant respectfully submits that pending claims 27-32, 34, and 46-50 are in form for allowance and are not taught or suggested by the cited references. Therefore, reconsideration and withdrawal of the rejections and allowance of claims 27-32, 34, and 46-50 are respectfully requested.

No fees are required under 37 C.F.R. 1.16(h)(i). However, if such fees are required, the Patent Office is hereby authorized to charge Deposit Account No. 50-0471.

The Examiner is invited to contact the Applicant's representative at the below-listed telephone numbers to facilitate prosecution of this application.

Any inquiry regarding this Amendment and Response should be directed to Steven E. Dicke at Telephone No. (612) 573-2002, Facsimile No. (612) 573-2005. In addition, all correspondence should continue to be directed to the following address:

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